

and as being therefore the rudiment of a primitive renal organ,<sup>1</sup> which opened by lateral ducts upon the side wall of the body; while the connection of the pituitary body with the stomodæum in embryo vertebrates is regarded as being not its original and proper duct, but a secondary connection, which has been formed with a lost sense-organ placed at, or in front of, the anterior end of the pharynx, and homologous with the dorsal tubercle in the Tunicata.

Ussow and Julin have conclusively shown that the dorsal tubercle is not merely a sense-organ. The complex structure which the tubercle usually presents seems to indicate that it is not merely the aperture of a duct. Whether, as I suggest, it may be a sense-organ into which the duct has come to open can scarcely be determined on the evidence at present in our hands. The lines of investigation which may be reasonably expected to throw additional light upon the matter are: (1) the exact course of development of the renal gland and the dorsal tubercle, and further information as to the pituitary body; and (2) the examination of the condition of the gland and its ducts throughout the Tunicata, and especially in a large number of specimens of *Ascidia mammillata*, a species in which these organs appear to be in a variable and highly interesting condition.

W. A. HERDMAN

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—Mr. W. H. Caldwell, B.A., Fellow of Caius College, has been selected to proceed to Australia to endeavour to solve the important questions connected with the reproduction and the embryology of the Monotremata, which have so long baffled inquiry.

Mr. S. F. Harmer, B.A., of King's College, 1st Class in the Natural Sciences Tripos 1883, has been appointed Demonstrator of Comparative Anatomy, in the vacancy caused by Mr. Caldwell's resignation.

Mr. W. F. R. Weldon, B.A., of St. John's College, has been appointed Prosecutor to the Zoological Society.

Mr. J. Bateson, B.A., of St. John's College, is proceeding to North America to study the life-history of *Balanoglossus*.

Mr. J. Roberts, B.A., of St. John's College, has been appointed assistant to the Woodwardian Professor.

Prof. Macalister will hold a class in Osteology in the long vacation.

Dr. Humphry has been elected Professor of Surgery.

### SCIENTIFIC SERIALS

THE *American Journal of Science*, July.—On the genesis of metalliferous veins, by Joseph Le Conte. From his study of the phenomena of metalliferous deposit by solfataric action at Sulphur Bank and Steamboat Spring, the author argues against Dr. F. Sandberger ("Untersuchungen über Erzgänge," Wiesbaden, 1882) that all lodes have been formed by deposit from solutions. In this important paper the conditions under which the deposits take place and the character of the solvents are fully discussed. Besides simple water, whose solubility is greatly increased by super-heat and pressure, the most active agency appears to be alkali in the form of alkaline carbonates or alkaline sulphides, or both. Such alkaline carbonate waters, ascending slowly towards the surface through underground fissures, gradually lose much of their solvent power both by cooling and by relief of pressure, and must of necessity deposit in their courses, and form metalliferous veins. In this way even cinnabar and gold may be precipitated. Other powerful agencies may be organic matter of universal occurrence in subterranean waters, and known to be potent in reducing metallic oxides and metallic salts. Mainly by these methods it is argued that alkaline waters at various temperatures, but mostly hot, circulating in all directions, but mainly up-coming, and in any kind of water-way, but mainly in open fissures, form by deposit mineral veins. Amongst the many subjects incidentally treated are: Association with metamorphism, variation in vein contents; variation of richness with depth; origin of alkaline and metallic sulphides; occurrence of gold; irregular, brecciated, contact, and other kinds of lodes.—Evolution of the American

trotting horse, by Francis E. Nipher. By an ingenious process of calculation the author arrives at the conclusion that the maximum speed to which the American trotting horse will constantly approximate without ever reaching it is a mile in ninety-two seconds.—The burning of lignite *in situ*, by Charles A. White. The ignition of the lignite beds still burning in Montana, and of others long extinct in Colorado, Wyoming, Dakota, and elsewhere, is attributed mainly, if not altogether, to spontaneous combustion, according as the deposits become by erosion successively exposed to atmospheric influence.—On the parameorphic origin of the hornblende of the crystalline rocks of the North-western States, by R. D. Irving. An examination of about 1000 sections representing the crystalline schists, and eruptives and basic eruptives of a region 400 miles by 300, and of three distinct geological systems, showed the occurrence of no hornblende not clearly or very probably secondary to augite.—On the constituents of the meteorites which fell at Bishopville, South Carolina, in March, 1843, and at Waterville, Maine, in September, 1826, by M. E. Wadsworth.—A simple method of correcting the weight of a body for the buoyancy of the atmosphere when the volume is unknown, by Josiah Parsons Cook.—Recent investigations concerning the southern boundaries of the glaciated area of Ohio, by G. F. Wright. The limit is determined by an irregular line running from Aurora near New Richmond, in a north-easterly direction through Chillicothe, Newark, Dunville, and Canton, to New Lisbon, near the Pennsylvania frontier.—On the variation of the specific heat of water, by G. A. Liebig.

*Bulletins de la Société d'Anthropologie de Paris*, tom. v. fasc. v. 1882.—On the tribes of Terra del Fuego, by M. O. Beaugard.—A paper by M. G. de Rialle on M. O. Beaugard's views regarding the origin of the Dardous, communicated to the Society in April, 1882, in which M. de Rialle contests the opinion that the Thibetan races are Mongols. He considers that the monosyllabic character of their language is a distinct proof of their non-Mongolian origin, the Mongol being an agglutinated form of speech belonging to the Altaic linguistic families. In reply to his objections M. O. Beaugard read a voluminous paper at a subsequent meeting, on the ancient and modern ethnography of Cashmere and Thibet, which is mainly based on Stanislas, Julien, Deguignes, and other older French authorities, and on modern English writers, more especially Major Biddulph, to whose important labours and accuracy M. Ujfalvy bore testimony in his defence of M. de Rialle's views.—Observations by M. Hamy on the anthropology of the Comalis of the East African coast.—Exposition, by M. de Nadaillac, of the scope and character of his work, "L'Amérique Préhistorique," presented by him to the Society.—Zoological observations in Equatorial Africa during M. de Brazza's expedition, by M. Cornevin, derived from the notes of the naturalist, M. Michaud. From these it would appear that in the valley of the Ogoone the climate is constant, the temperature standing generally at about 90° Fahr. Maize, manioc, and tobacco are grown. The people are courageous but peaceable. The sheep have no wool and only little hair. A dark, fierce race of cattle, feared by the natives, abounds in the forests, but there are no indigenous horses.—Observations on the Galibis, by M. Dally.—On the anthropological distinctions between the two races confounded under the common name of Kabyles, by M. Sabatier.—On the flint instruments, including a lasso of the Quaternary period, found in the gravel beds of Sarliève, by Dr. Pommerol.—On the horse of prehistoric and historic times, by M. Pietrement.—On the dental mutilations of the ancient inhabitants of Mexico and Yucatan, by M. Hamy.—On social instinct, by Madame Clémence Royer. This paper, intended to supplement the writer's larger work, "L'Origine de l'Homme et des Sociétés" (published in 1870), considers social instinct in relation to plants as well as to animals generally.—Craniological observations on a series of the crania of assassins, by M. Orchanski, considered specially with reference to the relation between the skull and the face. The author's determinations are in close accord with those of MM. Ten-Kate and Bordier.—On the existence of a rudimentary cæcal appendage in some of the Pitheci, by M. Hervé.—Remarks on certain differences between Catholics, Protestants, and Jews, as to the relations among them of deaths and births, by M. G. Lagneau. The author finds that the Catholics generally, with a somewhat higher natality, have a considerable infantile mortality, resulting in a correspondingly feeble increase of population, while among Protestants this increase is often much higher, notwithstanding a somewhat smaller natality, which, however, is corrected by a

<sup>1</sup> Not the pronephros, since that is found along with the pituitary body in many vertebrates, but possibly more ancestral. Might it not be the homologue of the provisional trochosphere excretory organs described by Hatschek and others in *Polygordius* and some Mollusca?

lower infantile mortality. The Jews present a much more rapid increase of numbers than either of the other two religious bodies, for, although their natality is less than either, their mortality is remarkably low for all ages, these conditions being probably due to their dietetic and hygienic regulations, the infrequent occupation of women out of their homes, early marriages, and general sobriety.

## SOCIETIES AND ACADEMIES

### EDINBURGH

**Royal Society, July 2.**—The Astronomer-Royal for Scotland communicated a paper, which was read by Prof. Crum Brown, on the group  $b$  in the solar spectrum, as observed with the remarkably fine spectroscope which Prof. Tait had recently secured for the University. The main conclusion came to was that the speculations regarding the existence of *basic* lines were unwarrantable, since the lines  $b^3$  and  $b^4$  were both distinctly double lines, each real single line in all probability being due to one of the substances, magnesium, iron, or nickel. The paper gave a complete historical statement of the observations of the  $b$  group by Swan, Ångström, Thalén, Young, and others, since the year 1830.—Prof. C. G. Knott read a paper on superposed magnetisms in iron and nickel. The experiments were, in part, a repetition of Wiedemann's well-known investigations into the twisting of iron wire under the influence of longitudinal and circular magnetisations. With a steady current along the wire, and a varying current in a helix round the wire, a twist was obtained which in almost every case reached a maximum for an intermediate value of the helical current. The maximum occurred sooner when the longitudinal current was diminished. No such maximum was obtained in the case of nickel, which twisted more and more for greater and greater currents, until the point of magnetic saturation was reached. Again the nickel twisted in the opposite direction to iron, other things being the same—a result in accordance with Barrett's observation that nickel *contracts* when magnetised, while, as Joule first proved, iron *extends*. The effect of weighting the wires so as to subject them to different tensions, was also investigated, the general result being that the twist was greater for the smaller weight, except for special combinations of current strengths and weights.—Prof. Tait gave further results as to the lowering of the maximum density point of water under increased pressure. By an improved method he estimated the lowering to be  $2\cdot7^\circ$  C. for one ton's weight per square inch, a result in wonderful agreement with that obtained by the indirect method carried out by Professors Marshall and Smith and Mr. Omond.—In a note on surface emissivities, Prof. Tait drew attention to the apparent lack of data on this subject, which, however, could be largely supplied from the numerous observations by Prof. Forbes and himself on the rate of cooling of the bars used in the conduction of heat experiments.—Prof. Tait also submitted to the Society a photograph of the markings on the arm of the boy who had been struck by lightning at Duns some weeks ago.

### PARIS

**Academy of Sciences, July 9.**—M. Blanchard, president, in the chair.—On the pyroelectricity in blende, chlorate of sodium, and borazite, by MM. C. Friedel and J. Curie.—On the separation of gallium from tellurium and silicium, by M. Lecoq de Boisbaudran.—Observations on M. Hirn's recently published work on "The Phenomena due to the Action of the Atmosphere on Falling Stars, Aërolites, and other Meteoric Objects," by M. Daubrée. In this work the author argues that the apparition of all kinds of meteors in space, their luminosity and explosion, and accompanying sounds depend directly and exclusively on their velocity. This general conclusion is questioned by M. Daubrée, who points out that account must also be taken of the chemical action produced at contact of meteoric substances with the atmosphere.—On the infra-red spectra emitted by metallic vapours, by M. Henry Becquerel. The metallic vapours here dealt with are those of sodium, magnesium, calcium, potassium, silver, and thallium. The method of analysis described by the author opens a new and wide field of observation, comprising between the wave-lengths 760 and 1300 an interval of wave-lengths greater than that existing between the extreme red of the visible spectrum and the last-known ultra-violet rays.—Researches on the destruction and utilisation of the bodies of animals that have died of contagious

diseases, and especially carbon poison, by M. Aimé Girard. The method here proposed consists in dissolving the carcasses at a low temperature in concentrated sulphuric acid, and then utilising the liquid thus obtained in the production of a superphosphate of azotic lime.—A protest is presented to the Academy on MM. Delattre's recent paper (meeting of May 21) on the treatment of the waters used in woolwashing. MM. Gaillet and Huet claim to be the real authors of the process, and support their claim by sundry documents.—On the conditions of the subsoil under the Berlin Observatory; letter addressed to M. Faye by M. Foerster.—On a method capable of furnishing an approximate value for the integral

$\int_{-\infty}^{+\infty} F(x) dz$ , by M. G. Gourier.—Generalisation of the theorem of Jacobi on the partial determinants of the adjunct system, by M. Em. Barbier.—On the reduction of equations, by M. A. E. Pellet.—On a lever, a new system of Roman balance with automatic slider, by M. A. Picart.—General formulas of centred dioptric systems, by M. Monoyer.—A new method of determining the limits of electrolysis, by M. Ch. Truchot.—On samarium, by M. P. T. Clève.—On the blue colour obtained by the action of chromic acid on oxygenated water, by M. H. Moissan.—On tetric acid and its homologues, by M. W. Pawlow.—On the dimorphism of iodide of silver, by MM. Mallard and Le Châtelier.—On some new characteristic reactions of salts of gold, by M. Ad. Carnot.—On the alcoholates of soda, by M. de Forcrand.—On the pyrogeneration of colophony, by M. Ad. Renard.—Researches on the curve of muscular shocks in various maladies of the nervo-muscular system, by M. Maurice Mendelssohn.—Development and structure of tuberculous begonias, by M. Henri Duchartre.—Contributions to the study of the fermentation of breadstuffs, by M. L. Boutroux.—The microbes of the lymph of marine fishes, by MM. L. Olivier and Ch. Richet. The presence of parasites is clearly determined, and the authors conclude that microbes are nearly always present in the lymph, and consequently in the very tissues of the marine fishes.—Method of determining the quality of the wines of the south of France, by M. A. Audouinaud.

### BERLIN

**Physical Society, June 8.**—Dr. Martius discussed the two recently-discovered instruments which are employed for the measurement of small frequently-occurring variations of a current, the telephone and the capillary electrometer. The latter, as is well known, was constructed about ten years ago by Mr. Lippmann in the laboratory of Herrn Kirchhoff, and is based on the principle that a current passing through a meniscus changes its surface tension, and causes a movement of the meniscus. The frequent variations of weak currents are indicated with difficulty, if at all, by galvanometers and tangent compasses, but the capillary electrometer can make such variations, especially as they occur in electrophysiology, visible to the eye. It has therefore quite lately been employed in physiological experiments, and Dr. Martius has undertaken to investigate the capabilities of the apparatus in the form designed by Prof. Christiani, and described below. A glass tube drawn out at one end to a capillary, and partly filled with mercury, stands vertically in a large glass vessel also containing some mercury, and above it dilute sulphuric acid, in which the capillary point of the tube dips, so that the acid passes into the tube and up to the mercury meniscus. The position of the latter is read with a microscope. Metal wires are dipped into the mass of mercury, and a current can then be sent through the capillary tube, the current causing a motion of the mercury meniscus either upwards or downwards according to its direction, on a positive current flowing downward from the mercury in the tube moving the meniscus downwards, a negative current, upwards. In this apparatus care must be taken to keep the current too weak to cause electrolysis of the acid; otherwise the instrument becomes useless and must be refilled. The observations were first made with a constant current which was interrupted at will, and they showed that under exactly similar conditions the displacement which a positive current produced were always greater than those caused by a negative current of like strength. On making and breaking contact rapidly, for instance about twelve times a second, a total displacement of the mercury, corresponding to the direction of the current, was observed, and also oscillations of the meniscus, the number of which was equal to the number of interruptions of the current. If the number of interruptions was increased, a stronger current had always to be used in order to make the